

Application Number 10/806,489
Amendment dated May 6, 2005
Reply to Office Action of February 9, 2005

REMARKS

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Maegawa, *et al.* (U.S. Patent Number 5,191,399). In view of the amendments to the claims and the following remarks, the rejections are respectfully traversed, and reconsideration of the rejections is requested.

In the present invention of claims 1-10, a method of manufacturing an image sensor having a photo diode includes forming a first n-type photo diode region by implanting first n-type impurities into a portion below a p-type photo diode region. Further, the method includes forming a second n-type photo diode region by implanting second n-type impurities having a greater projection distance and diffusivity than the first n-type impurities into a portion surrounding the first n-type photo diode region.

The claims are amended to clarify certain features of the invention. Specifically, the claims are amended to recite the second n-type impurities having a greater projection distance and diffusivity than the first n-type impurities. It is believed that this clarifying language clarifies the patentable distinctions between the present invention and the cited references.

As noted in the Office Action, the AAPA fails to disclose forming a second n-type photo diode region by implanting second n-type impurities into a portion surrounding the first n-type photo diode region. Thus, AAPA further fails to teach or suggest the second n-type impurities having a greater projection distance and diffusivity than the first n-type impurities, as claimed in claims 1-10.

Maegawa, *et al.* is cited in the Office Action as disclosing forming a p-conductivity type region 6, a n-conductivity type region 5', and a n-conductivity type region 9. The same type of impurities are used in n-conductivity regions 5' and 9, however the impurities are of different concentrations.

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Maegawa, *et al.* fails to teach or suggest forming a second n-type photo diode region by implanting second n-type impurities having a greater projection distance and diffusivity than the first n-type impurities into a portion surrounding the first n-type photo diode region, as claimed in claims 1-10. Instead, in Maegawa, *et al.* the type of impurities used in the first n-conductivity type region and the second n-conductivity type region are the same, and thus, the impurities of both regions have the same projection distance and diffusivity.

Neither of the AAPA and the Maegawa, *et al.* patent teaches or suggests certain elements of the claimed invention set forth in claims 1-10. Specifically, neither of the AAPA and the Maegawa, *et al.* patent teaches or suggests forming a second n-type photo diode region by implanting second n-type impurities having a greater projection distance and diffusivity than the first n-type impurities into a portion surrounding the first n-type photo diode region, as claimed in claims 1-10. Accordingly, there is no combination of the references which would provide such teaching or suggestion. Therefore, the combination of the references fails to teach or suggest the invention set forth in the amended claims.

Neither of the AAPA and the Maegawa, *et al.* patent, taken alone or in combination, teaches or suggests the invention set forth in the amended claims 1-10. Therefore, it is believed that the amended claims 1-10 are allowable over the cited references, and reconsideration of the rejections of claims 1-10 under 35 U.S.C. § 103(a) based on AAPA and Maegawa, *et al.* is respectfully requested.

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In view of the amendments to the claims and the foregoing remarks, it is believed that all claims pending in the application are in condition for allowance, and such allowance is respectfully solicited. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,



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